

Bean Tunnel

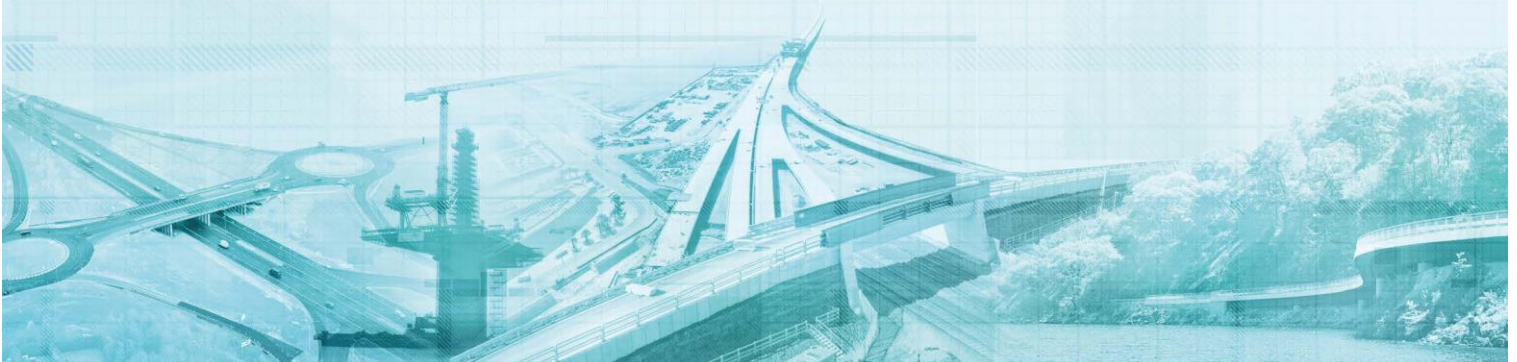
Specification Appendices - Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts

Kent County Council

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APPENDIX 13/1 – General Requirements and Information

1.1. General

- 1.1.1. Columns and bracket arms shall comprise those types described in Table 13/1-1 of this Appendix
- 1.1.2. Columns shall also be deemed to include lit traffic signposts in accordance with TSRGD 2016 within this Appendix.
- 1.1.3. Luminaire types shall comprise of those types described in Table 14/4-1 of Appendix 14/4.
- 1.1.4. Column locations and references are detailed in Table 14/2-1 of Appendix 14/2, relating to the column reference numbers as per Lighting Layout drawing no BRT-TG-XX-ZZ-DR-LI-1302.
- 1.1.5. Column reference numbers are detailed in Table 13/1-1 of this Appendix and may not necessarily represent the final identification markings to be applied following the completion of Works. Following the completion of Works, the Contractor shall consult with the Street Lighting Asset Manager to confirm the reference numbers to be added on site.
- 1.1.6. The column manufacturer shall be registered and certified with a Certification body listed in Table A/2 of Appendix A Volume 1 of the SHW to quality Management Scheme number 6 for the manufacture, supply and verification of lighting columns.
- 1.1.7. New columns to be retained for the permanent works shall not be used to support catenary cables.
- 1.1.8. Columns shall be designed in accordance with the requirements of DMRB CD 354 (formally BD 94/17), BS EN 40 and PD 6547.
- 1.1.9. This Appendix shall be read in conjunction with Lighting Layout drawing no. BRT-TG-XX-ZZ-DR-LI-1302.
- 1.1.10. Corrosion and root protection for columns shall be as per Table 13/1-1.

1.2. The contractor shall submit the following information

- 1.2.1. The Contractor shall establish the soil types on site and submit, to the Project Manager for its acceptance, column foundation details appropriate to the conditions discovered and in accordance with the requirements of Appendix 1/11.
- 1.2.2. The Contractor shall submit to the Project Manager a Column and Bracket Data Sheet, design and check certificates for each individual proposed column and

bracket arm combination to be used not later than 3 weeks prior to the use of the goods or materials in the works as required by Clause 1302.1 of the Specification for Highway Works.

- 1.2.3. The Contractor shall complete the Column and Bracket Data Sheets (Appendix 13/2) in accordance with the Instruction for Completion (Appendix 13/3) and submit them to the engineer for approval.

- 1.2.4. The following values shall be established by the Contractor for the actual equipment being offered:

The luminaire maximum weights and windage areas, and centres of application of the forces from the centroid of the column shaft.

Connection diameter, length, and angle of the luminaire(s) to be securely mounted.

Size requirements for the base compartment(s) to accommodate for all necessary control gear, isolation and / or distribution equipment.

1.3. Identification and Location Markings

- 1.3.1. This section also includes identification and location markings for feeder pillars.
- 1.3.2. Final reference numbers shall be in accordance with Bluewater maintenance requirements
- 1.3.3. Lighting units that are a direct replacement shall retain the existing reference number.
- 1.3.4. Reference numbers shall be applied after any on-site protective treatments.
- 1.3.5. Each lighting unit shall be individually identified by a reference marker in the form shown on standard detail drawing KCC/SD/1300/002.
- 1.3.6. Reference numbers shall be mounted onto the lighting column as shown on standard detail drawing KCC/SD/1300/002.
- 1.3.7. For lighting columns with double bracket arms and two side entry mounted luminaires, a reference number shall be provided for each luminaire.
- 1.3.8. Main feeder pillars shall have a 4-digit reference number consisting of a L400mm x W100mm self-adhesive sticker with 75mm 'black' alphanumeric characters on a 'white' background.
- 1.3.9. Sub-main feeder pillars shall have a 6-digit reference number consisting of a L600mm x W100mm self-adhesive sticker with 75mm 'black' alphanumeric characters on a 'white' background.

- 1.3.10. Reference numbers for feeder pillars shall be mounted facing perpendicular to the carriageway and / or approaching traffic at 50mm from top horizontal edge of the feeder pillar side wall.
- 1.3.11. Reference numbers for feeder pillars shall be mounted facing perpendicular to the carriageway and / or approaching traffic at 50mm from top horizontal edge of the feeder pillar side wall.
- 1.3.12. Feeder pillar warning labels shall be as per standard detail drawing KCC/SD/1400/032.

1.4. Column Foundations, Anchorages and Attachment Systems

- 1.4.1. The Contractor shall consult with the column manufacturer to determine the appropriate foundation design in accordance with the requirements of the manufacturer column data sheets, SHW Series 1300, BS EN 40 and PD 6547 for the column and soil types specified in Table 13/1-1 unless provided by the Designer. Should the specific soil type (Ground Factor) be determined on site by the Contractor as 'poor' in accordance with PD 6547, the planting depth of columns may be increased in accordance with BS EN 40-2.
- 1.4.2. Bracket arms shall be installed in accordance with the manufacturer's recommendations.
- 1.4.3. A single 90° bend preformed 50mmØ minimum MDPE twin-wall flexible access duct compatible with the new / existing ducted system shall be provided through each column foundation as appropriate.
- 1.4.4. The Contractor shall reinstate verge (unpaved); footway, under carriageway and (all paved) ground surfaces deemed as permanent (by definition), as per existing / required construction in materials like those removed:

Carriageway to SHW Series 700 requirements;

Footway to SHW Series 700 and 1100 requirements.

Verge to SHW Series 600 and 3000 requirements (top soiling and grass seeding specifically to SHW Clause 618 and 3005).

- 1.4.5. Concrete column bases to be in accordance with SHW Clause 1305, Part 4.
- 1.4.6. Excavation, trimming and reinstatement of unpaved and paved areas to SHW Clause 706.
- 1.4.7. Excavation around column foundations shall be backfilled with General Granular Fill Class 1A - 1C and compacted to SHW Clause 602, 604 and 612. Where mechanical compaction is impracticable, the excavation shall be backfilled with ST2 concrete.

- 1.4.8. Earth material as backfill shall not be permitted
- 1.4.9. Otherwise unacceptable ground and soft spots surrounding and at the bottom of all column excavations shall be removed and backfilled with ST1 concrete; disturbed ground surrounding adjacent services to also be made good by the Contractor.
- 1.4.10. Geotextile fabric wrapping shall be used by the Contractor, laid to protect adjacent existing services from being blocked or disrupted.
- 1.4.11. Column holes shall be excavated carefully by hand to required dimensions and cut square at bottom; the stepped hole method of excavation shall not be permitted.
- 1.4.12. Column holes shall be backfilled with concrete in a single operation in 150mm thick layers and be well compacted; the concrete shall be extended from the base of the column to ground level.
- 1.4.13. During compaction, care shall be taken to ensure that the corrosion and root protection system of the column is not damaged.
- 1.4.14. Concrete may be lowered by the thickness of the applied paving or bituminous surfacing.
- 1.4.15. 2no. cube tests shall be taken for each base and the base must not be loaded until test results confirm the concrete has achieved the required strength.
- 1.4.16. Standard columns excluding flange plate columns shall be installed on a bed formed of a 75mm minimum deep layer of Grade ST5 concrete lean mix in situ and have a minimum surround of 100mm Grade ST5 concrete mix.
- 1.4.17. Where columns are installed within the verge, the surrounding fall from the column face laid to the adjacent ground level shall be as shown on standard detail drawing KCC/SD/1300/001.

1.5. Erection

- 1.5.1. The safety requirements in relation to underground and overhead obstruction and column lifting, as outlined in the following guidance notes and recommendation documents must be observed:

ILP (previously ILE) GP03:2011 'CoP for Electrical Safety in Highway Electrical Operations.'

ILP GP10:1995 'Safety During the Installation and Removal of Lighting Columns and Similar Street Furniture in Proximity to High Voltage Overhead Lines.'

HSE HSG47 'Avoiding danger from underground services.'

HSE GS6 'Avoiding danger from overhead power lines.'

Construction, Design and Management Regulations 2015 (CDM).

EN 50494 Engineering Recommendations (EREC) G39/1.

- 1.5.2. Luminaires, attachments, control gear, isolation and / or distribution equipment shall not be fitted until the column is installed in position and has been left undisturbed for a minimum of 48 hours and / or once the concrete has achieved its design strength.
- 1.5.3. Following the completion of Works, columns shall be installed truly vertical and the luminaire shall be checked so that it is perpendicular to the edge of carriageway.
- 1.5.4. All locks, hinges and catches shall be re-greased following the completion of Works.
- 1.5.5. To protect the column finish, nylon webbed slings shall be used to lift the column by crane arm.

1.6. Requirements for Columns and Brackets

- 1.6.1. Column type references are as required by Table 13/1-1.
- 1.6.2. All equipment and materials shall comply with British or European Standards applicable at their date of purchase.
- 1.6.3. Bracket arms shall be made tight to the column and secure to the required torque settings using a calibrated torque wrench in accordance with the manufacturer's recommendations.
- 1.6.4. Luminaires shall be made tight and securely mounted to the column in a side entry to a bracket arm as per Table 13/1-1, to the required torque settings using a calibrated torque wrench and in accordance with the manufacturer's recommendations. The fixture arrangement shall allow adjustment and ensure that once set in position, the luminaire will not be subject to further movement.
- 1.6.5. Deformed columns, bracket arms and doors shall not be permitted.
- 1.6.6. Standard columns shall be provided with a minimum cable entry slot of H150mm x W75mm to SHW Clause 1309.
- 1.6.7. Columns shall be fitted with a weatherproof single flush fitting door c/w earth terminal assembly incorporating a M8 stud, nuts and two washers constructed of brass or stainless steel. The earthing stud shall be so positioned as to be readily accessible through the door opening.

- 1.6.8. Column base compartments shall be fitted with a full length 12mm thick or greater backboard constructed of hardwood or other non-hygroscopic material, i.e. marine plywood; treated with a moisture repellent clear lacquer. The backboard will be fixed in the base compartment by two welded backboard retainers and two flush fitting stainless steel screws. The backboard will be suitable for the connection of all electrical equipment as required.
- 1.6.9. All lighting and electrical equipment shall be bonded to a dedicated 8-way brass earth terminal block mounted on the backboard.
- 1.6.10. Where double door columns are required, two backboards shall be fitted with the earth terminal located within the lower base compartment.
- 1.6.11. Door openings, bracket arms and columns shall be free from irregularities, burrs or sharp edges.
- 1.6.12. Arc welds to BS EN 1011 and positioned to avoid damage to electrical cables.
- 1.6.13. Fixings (doors, door hinges, chains and locks) shall be stainless steel or steel, hot dipped galvanised to BS EN ISO 1461 and SHW Clause 1909.
- 1.6.14. Columns and brackets shall be handled, transported and stored to SHW Clause 1308.
- 1.6.15. Columns and bracket arms to have permanent, legible and visible identification markers; either externally formed in the material, hard stamped or on a permanent fixed label to SHW Clause 1304. The identification marker shall indicate the following:
 - a) *The name of the manufacturer;*
 - b) *The year of manufacture;*
 - c) *A reference to BS EN 40;*
 - d) *A unique product code;*
 - e) *Other relevant information.*
- 1.6.16. All standard columns shall be constructed of steel sheet and plate, hot finished steel tube or cold-finished steel tube to Grade S275 or greater; hot dipped galvanised to BS EN ISO 1461. Galvanising shall be fettled and rasped to remove all spikes and sharp edges and leave a smooth finish prior to paint application.
- 1.6.17. Brackets shall be securely fixed into position in accordance with the manufacturer's recommendations and be fitted with an anti-rotation device to prevent rotation in service

- 1.6.18. The column shall be installed / aligned truly vertical with the door position in relation to the carriageway / as follows:
- 1.6.19. The column door location shall be positioned to enable the inspection of the interior, while still observing the nearside traffic flow as shown on standard detail drawing KCC/SD/1300/001.
- 1.6.20. Spigot adaptors shall be of a flush fit, to maintain the smooth parallel line between the column and the bracket arm.
- 1.6.21. Where specified, brackets arms shall incorporate a welded web and may be specified with alternative tilt inclinations.
- 1.6.22. The method of bracket arm attachment to columns shall prevent the bracket arm revolving in windy / turbulent conditions by means of a positive alignment anti-rotation device.
- 1.6.23. All columns shall be earthed in accordance with BS 7671:2018+A1:2020 and BS 7430:2011+A1:2015.
- 1.6.24. Columns shall have a circular cross-section; and be of the folded, stepped tubular or conical / tapered type.
- 1.6.25. Columns shall take the extra loading of a sign face to it, subject to the column having the appropriate road sign class in accordance with BS EN 40-3. The required classifications are as required by Table 13/1-1.
- 1.6.26. Certification shall be provided by the column manufacturer as proof the column can take the load.

Table 13/1-1 – Columns types	
Column Type	A [As per DW Windsor drawing no. 3D20602-14]
Column Reference No. & Quantity.	LC05A/B (Qty = 1)
Mounting Height	10 metres
Height of installation above ground level	10 metres
Column Material	Conical Steel
Column Fixing Type	Root
Door Type and size	As per DW Windsor drawing no. 3D20602-14. (Twin lock)
Bracket Projection	Twin arm. 1200mm projection, 90-degree bracket as per DW Windsor drawing no. 3D20602-14
Luminaire fixing; Size, Length & Angle	Side Entry mounted Ø 42 mm, 0° Tilt
Luminaire weight, windage	2 no. DW Windsor RIO 500, 20.0 kg / 0.14m²
Strength required before loading	As per manufacturer's recommendations
Corrosion protection	Bluewater Aubergine PSX700. Column finish and corrosion protection system as recommended by manufacturer. See Works Specification Appendix 19/1
Root Protection	As above
Earthing	To BS 7671 BS 7671:2018+A1:2020 and BS 7430:2011+A1:2015
Administrative Area	Kent – Location is within 5km of the coast
Mean hourly wind speed (Vref)	Kent - 22.5 m/s
Site Altitude (Max)	Kent – 178m
Topography Factor	1
Rationalised Wind Loading Region	Kent - Light
Terrain Category	II
Partial Safety Factors on Loads	Class B
Deflection Class	Class 3
Soil Type	Poor
Road Signs	Class A

Speed Class	N/A
Energy Absorption Category	N/A
Fatigue requirements	DMRB CD 354

Column Type	B [As per DW Windsor drawing no. 3D20602-11]
Column Reference No. & Quantity.	LC01 / LC02 (Qty = 2)
Mounting Height	8 metres
Height of installation above ground level	8 metres
Column Material	Conical Steel
Column Fixing Type	Root
Door Type and size	As per DW Windsor drawing no. 3D20602-11 . (Twin lock)
Bracket Projection	Single arm bracket (550mm projection) as per DW Windsor drawing no. 3D20602-11 .
Luminaire fixing; Size, Length & Angle	Side Entry mounted $\varnothing$ 32-60 mm, 0° Tilt
Luminaire weight, windage	1 no. Signify BGP704 (LUMA Medium), 11.5.5 kg / 0.063m²
Strength required before loading	As per manufacturer's recommendations
Corrosion protection	Bluewater Aubergine PSX700. Column finish and corrosion protection system as recommended by manufacturer. See Works Specification Appendix 19/1
Root Protection	As above
Earthing	To BS 7671 BS 7671:2018+A1:2020 and BS 7430:2011+A1:2015
Administrative Area	Kent – Location is within 5km of the coast
Mean hourly wind speed (Vref)	Kent - 22.5 m/s
Site Altitude (Max)	Kent – 178m
Topography Factor	1
Rationalised Wind Loading Region	Kent - Light
Terrain Category	II

Partial Safety Factors on Loads	Class B
Deflection Class	Class 3
Soil Type	Poor
Road Signs	Class A
Speed Class	N/A
Energy Absorption Category	N/A
Fatigue requirements	DMRB CD 354

Column Type	C [As per DW Windsor drawing no. 3D20602-15]
Column Reference No. & Quantity.	LC08A/B (Qty = 1)
Mounting Height	10 metres
Height of installation above ground level	10 metres
Column Material	Conical Steel
Column Fixing Type	Root
Door Type and size	As per DW Windsor drawing no. 3D20602-15.
Bracket Projection	Twin arm bracket 180 degree (1200mm projection) as per DW Windsor drawing no. 3D20602-15
Luminaire fixing; Size, Length & Angle	Side Entry mounted Ø 42 mm, 0° Tilt
Luminaire weight, windage	2 no. DW Windsor RIO 500, 20.0 kg / 0.14m ²
Strength required before loading	As per manufacturer's recommendations
Corrosion protection	Bluewater Aubergine PSX700. Column finish and corrosion protection system as recommended by manufacturer. See Works Specification Appendix 19/1
Root Protection	As above
Earthing	To BS 7671 BS 7671:2018+A1:2020 and BS 7430:2011+A1:2015
Administrative Area	Kent – Location is within 5km of the coast
Mean hourly wind speed (Vref)	Kent - 22.5 m/s
Site Altitude (Max)	Kent -

Topography Factor	1
Rationalised Wind Loading Region	Kent - Light
Terrain Category	II
Partial Safety Factors on Loads	Class B
Deflection Class	Class 3
Soil Type	Poor
Road Signs	Class A
Speed Class	N/A
Energy Absorption Category	N/A
Fatigue requirements	DMRB CD 354

1.7. As-Built Lighting Column Schedule (Contractor to Complete)

1.7.1. Upon completion of the works, the contractor shall fill in the table below.

Column Ref	Bracket	Column Type	Location (OS coordinates)	Offset	Base	Notes

APPENDIX 13/2 – Specification for Highways Works, Typical Lighting Column and Bracket Data – Sheet 1

Name of Manufacturer:

Column Reference No:

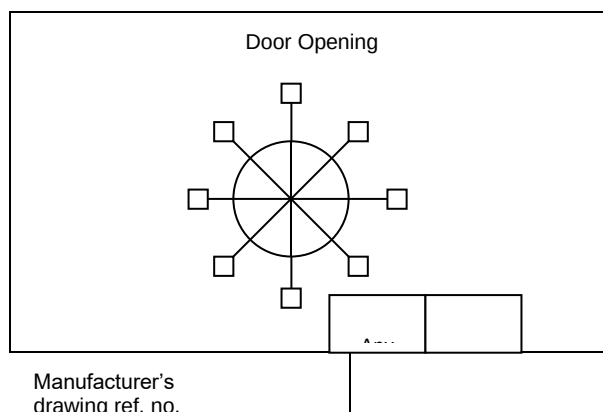
Revision No:

Date:

NAME OF CONTRACT
Part A General

Column nominal height				(m)
Column Material				
Material Design Strength				(N/mm ²)
No. of door openings				
Door opening size – Height				(mm)
– Width				(mm)
Cross section of base compartment	Height (mm)	Width (mm)	Depth (mm)	

Acceptable positions of bracket arms relative to door position



Corrosion protection (steel columns only) – basic system type (sub-Clauses 1911.9 and 1911.10)

Reference Wind Velocity $V_{ref,0}$ as defined in BS EN 40-3-1

Details of signs and attachments allowed for in the design Area (mm²), Eccentricity (mm), Height

- additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250mm above the anticipated ground level

Part B Foundation Design

Planted base

Planting depth

Diameter of concrete surround (if any)

Flange plate

Standard Soil Type Factor G		
630	390	230

Bolt hole centres	Hole diameter	Design load / bolt
(mm)	(mm)	(N)

Relevant forces and moments at ground level

Line of action of max. moment relating to door opening

NOTE: For flange plates with slotted holes a diagram shall be included with this Data Sheet

APPENDIX 13/2 – Specification for Highways Works, Typical Lighting Column and Bracket Data – Sheet 2

Part C Acceptable Luminaires

Luminaire: Maximum Characteristics

Post Top Column			Terrain Categories as defined in BS EN 40-3-1				
			I	II	III	IV	
	Luminaire Max Wt (kg)		Maximum Windage Area (m ²) for Terrain Categories as defined in BS EN 40-3-1				
	Luminaire Connection						
	Diameter	Length					

Single Arm Bracket Column:	Luminaire Lever Arm (mm)	
	Due to wt. of luminaire	Due to windage on luminaire

Bracket Projection (m)	Ref No.	Drawing No.	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Maximum Windage Area (m ²) for Terrain Categories as defined in BS EN 40-3-1				
			Grade	Design Strength (N/mm ²)		Diameter (mm)	Length (mm)						

Double Arm Bracket Column:	Luminaire Lever Arm (mm)	
	Due to wt. of luminaire	Due to windage on luminaire

Bracket Projection (m)	Ref No.	Drawing No.	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Maximum Windage Area (m ²) for Terrain Categories as defined in BS EN 40-3-1				
			Grade	Design Strength (N/mm ²)		Diameter (mm)	Length (mm)						

Part D Certification

It is certified that the information given in this Data Sheet has been obtained in accordance with Departmental Standard BD26 (DMRB 2.2.1) and the Specifications.

Signed on behalf of the Contractor.....Date.....

APPENDIX 13/3 – Instructions for Completion of Lighting Column and Bracket Data Sheets

1.8. GENERAL

- 1.8.1. When information is not required a dash shall be inserted in the appropriate boxes.
- 1.8.2. Where a Data Sheet is amended it shall be given a new revision number with a date.
- 1.8.3. The revision numbers shall be consecutive letters of the alphabet, commencing with “A”.
- 1.8.4. The date of the revision shall agree with the date of the Contractor’s signature.
- 1.8.5. The column or bracket material shall be steel.
- 1.8.6. The material design strength shall be the minimum specified in the design. Where more than one material is used values for all materials shall be given.
- 1.8.7. All relevant entries shall be made on the Data Sheet before the document is certified by the Contractor.

1.9. Column Data

- 1.9.1. The column nominal height shall be selected from BS EN 40-2 as appropriate.
- 1.9.2. The number of door openings shall agree with the manufacturer’s drawing.
- 1.9.3. The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.
- 1.9.4. The acceptable positions of bracket arms relative to the door position shall be indicated on the diagram. Where all positions are acceptable the box noted “ANY” shall be ticked.
- 1.9.5. Where concrete is necessary around the planted base in accordance with sub-Clauses 1305.3 and 1305.4 the minimum diameter shall be entered.
- 1.9.6. The corrosion protection system used on the column when new shall be recorded. Where additional steel is provided for sacrificial purposes, the amount shall be recorded.
- 1.9.7. The signs and attachments surface area, eccentricity from the centre line of the column to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

1.10. Bracket Data

- 1.10.1. The luminaire lever arms, weight and maximum windage area quoted shall be based on the most adverse loading on the bracket when it is attached to any of the columns quoted in the compatible column sections.

(Note: The luminaire lever arms are the horizontal distances from the centre of gravity of the luminaire and, if applicable, the centroid of the windage surface area to the end of the bracket joint).